

NOTICE

All drawings located at the end of the document.

Summary Report 1991 Revegetation Activities Jefferson County Remediation Lands

The 1991 revegetation activities consisted of:

- Performing a field assessment of the condition of the lands before starting work.
- Formulating a revegetation plan with input from the Soil Conservation Service and EG&G
- Mowing, seeding, harrowing, and spreading hay mulch at the site
- Monitoring for potential health hazards during the field operations

This report includes a brief summary of the work accomplished under each of the above activities and also contains recommendations for future work at the site.

Field Assessment

Before developing the plan for the field work, a field survey of the condition of the remediation lands was conducted in late April 1991.

The assessment determined that in the northern area (Section No. 7) less than 10 percent of the revegetated area which had been previously seeded, had grass species established in a good stand. The principal grasses that grew were smooth brome and pubescent wheatgrass, the two introduced species in the original seed mixture, and a few areas of sideoats grama in low abundance. Weed species were prevalent over much of the tilled soil. Erosion control was adequate except where prairie dogs kept the area bare and dug burrows. The surface of the soil was rocky in the northern portion of the remediated acreage such that range drilling was impractical, and could have contributed to the poor germination of the previous seeding efforts.

The southern area (Section No. 18) had better cover by grass species, principally western wheatgrass, blue grama, and big bluestem, that had survived the tilling and had reproduced by clumps and rhizomes.

Revegetation Plan

It was determined in meetings with the EG&G representative, Michael Guillaume, the SCS soil conservationist, Gary Finstead, the R. A. Consultants technical consultant, Sam Bamberg, and CH2M HILL's project manager, Phil Tscheschke, that the

goal of revegetation during the Remedial Action Program on Jefferson County Open Space Land was to revegetate the remediated areas to native grassland species that would be compatible with the other natural high plain grasslands in the vicinity. The land is considered as open space by Jefferson County and, before remediation, was a natural vegetation-type grassland that had been used as rangeland. This goal of establishment of a native grassland required a revision of some procedures used in the past based on an evaluation of present conditions.

Due to the previous disturbance of the soil surface by tilling and the total disruption of the native vegetation, completion of immediate revegetation goals of vegetation establishment will require a 2- to 5-year time frame. Long range goals should include management and control of the area to produce a diverse vegetation with cover and productivity approaching the natural vegetation.

Several constraints and factors influenced the development of the work plan for the 1991 Revegetation Program:

1. It was decided that the soil surface should be disturbed as little as possible to minimize disturbance of existing grasses, erosion potential, and health risks.
2. Fertilization was not considered necessary for the native species in this climate and soil conditions.
3. Hydroseeding was determined to be an inappropriate seeding method due to the expense required for the large number of acres involved and relatively poor performance expected under dry land conditions.
4. The field activities of mowing, seeding, harrowing, and mulching needed to consider the extreme rockiness of a good portion of the lands in the Section No. 7 strips and the presence of prairie dog colonies in many areas.
5. The expense of purchasing hay for mulching was not required, but the existing old hay bales on the site would be spread on adjacent areas as a mulch.
6. The revegetation plan needed to be flexible to accommodate changing site and weather conditions.

The selected revegetation plan included summer mowing of weeds, broadcast seeding of the grass mixtures in late fall, light harrowing of seeded areas, and spreading existing hay bales as a mulch on seeded areas.

Revegetation Work

The specifications for obtaining competitive bids for the revegetation work were completed and mailed to four potential subcontractors on June 21, 1991. The contract

was awarded to the lowest bidder, Phillips Seeding and Reclamation, Inc., Lafayette, Colorado, on July 10, 1991, and a contract was signed July 15, 1991. We identified 60.3 acres in the north site (Section No. 7) and 8.1 acres in the south site (Section No. 18) which required mowing because of weedy growths. Mowing began July 22, 1991 and was completed by approximately the end of July. There were some delays because of rain.

No additional mowings were required before planting.

The fall was dry and mild so the planting and harrowing was not started until November 12, and was completed November 14, 1991. A modified grass drill without the press wheels was used to broadcast the seed on the ground. An English chain harrow was pulled behind the drill to lightly incorporate the seed. The timing of the seeding was ideal because it started snowing a few days later and the weather turned cold. The cold weather was ideal because it would help assure that the seed would germinate in the spring and not the fall. The moisture from the snow was needed to replenish the dry soil.

Two seed mixtures were used, 37.4 acres were seeded to a cobbly foothills mixture and 32.7 acres were seeded to a clayey foothills mixture. The two seed mixtures are shown in Table 1. The approximate locations where the seed mixtures were sowed are shown on Figure Nos. 1 and 2.

The snow prevented the immediate spreading of the hay bales, but this was not critical for revegetation. The hay was spread December 19 through 26, 1991 with a few days break for the Christmas holiday and the weekend. The ground was bare and frozen. A light snow on January 1, 1992 helped to settle the hay mulch in place. The locations where the large hay pile on Section No. 7 was spread is shown on Figure No. 1. The hay from the isolated small piles in Section No. 18 were spread in the immediate vicinity of the piles and is not shown on a figure. A site visit by R. A. Consultants and CH2M HILL on January 3, 1992 revealed that no planted seed had yet begun growing, which was what was desired and expected.

Health and Safety

A site safety plan for the field activities was developed and followed in accordance with the requirements of IT Corporation and EG&G.

Radiological monitoring of the mowing, seeding, and harrowing field activities were performed by IT Corporation personnel. This monitoring consisted of personal and equipment contamination surveys. During the mowing activities, personal lapel air samples were also taken. Personal lapel air samples were not taken during the seeding and harrowing activities because the subcontractor did not work a minimum of 6 hours in each day and no survey could be taken. A minimum of 6 hours is required for the samples.

Table 1. Recommended seed mixes for Remedial Action Program on Jefferson County Open Space land. The seeding mixes are given as a seeding rate on a Pure Live Seed per acre basis, species epithet and common name and variety. (Alterations on August 14, 1991)

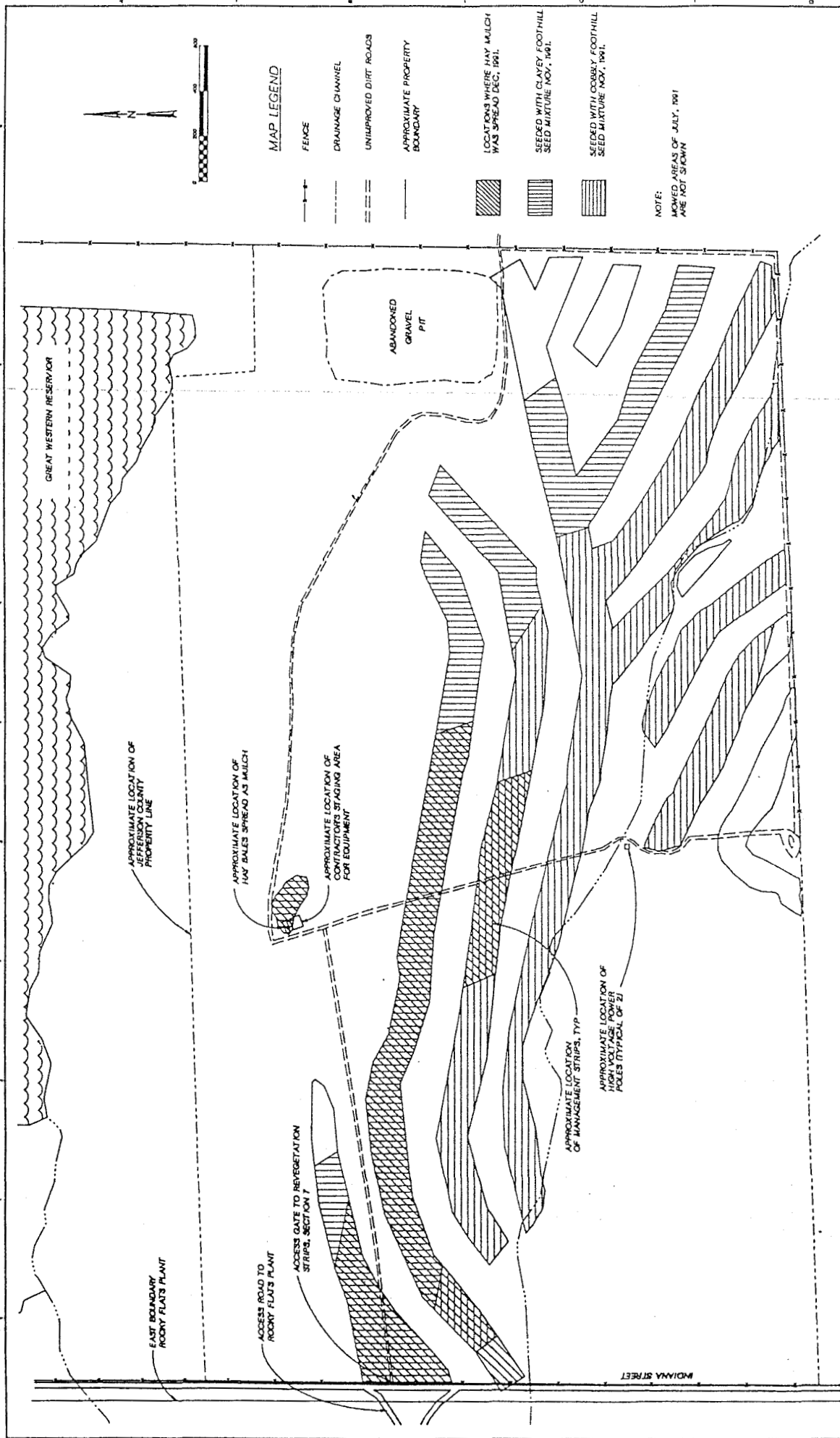
COBBLY FOOTHILL AREAS

<u>Species</u>	<u>Common name -variety</u>	<u>Seeding rate</u> <u>(PLS lb/ac)*</u>
Grasses:		
<i>Agropyron smithii</i>	Western wheatgrass - Arriba	8.0
<i>Bouteloua gracilis</i>	Blue gramma - Lovington	6.0
<i>Bouteloua curtipendula</i>	Sideoats grama - Vaughn	5.5
<i>Stipa comata</i>	Needle-and-thread - native	0.5
<i>Andropogon garardii</i>	Big bluestem - native, Kaw or Champ	2.0
<i>Schyzachyrium scoparium</i>	Little bluestem - Blaze, Pastura, Aldous, or Cimmaron	1.0
<i>Panicum virgatum</i>	Switchgrass - Blackwell or Nebraska 28	1.0
Shrubs:		
<i>Ceratoides lanata</i>	Winterfat - native or Hatch	0.3
<i>Chrysothamnus nauseosus</i>	Rabbitbrush - green plume, native	0.1
<i>Atriplex canescens</i>	Fourwing saltbush - native	0.5
Forbs:		
<i>Linum lewisii</i>	Blue flax - Appar	0.2
<i>Penstemon strictus</i>	Rocky Mtn. penstemon - Bandera	0.2
<i>Dalea purpurea</i>	Purple prairie clover - native or Kanab	0.5

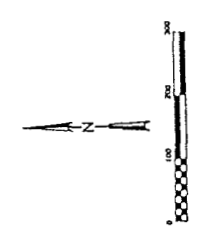
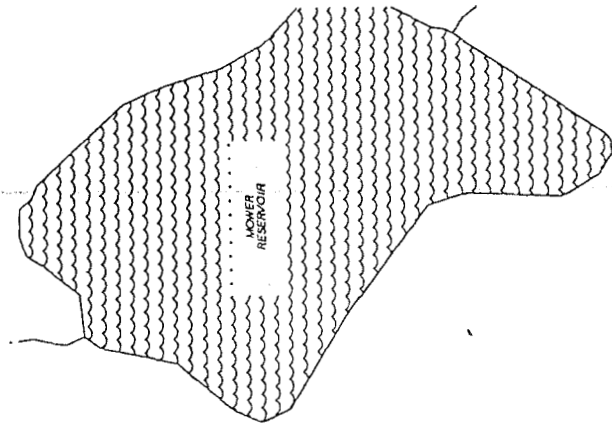
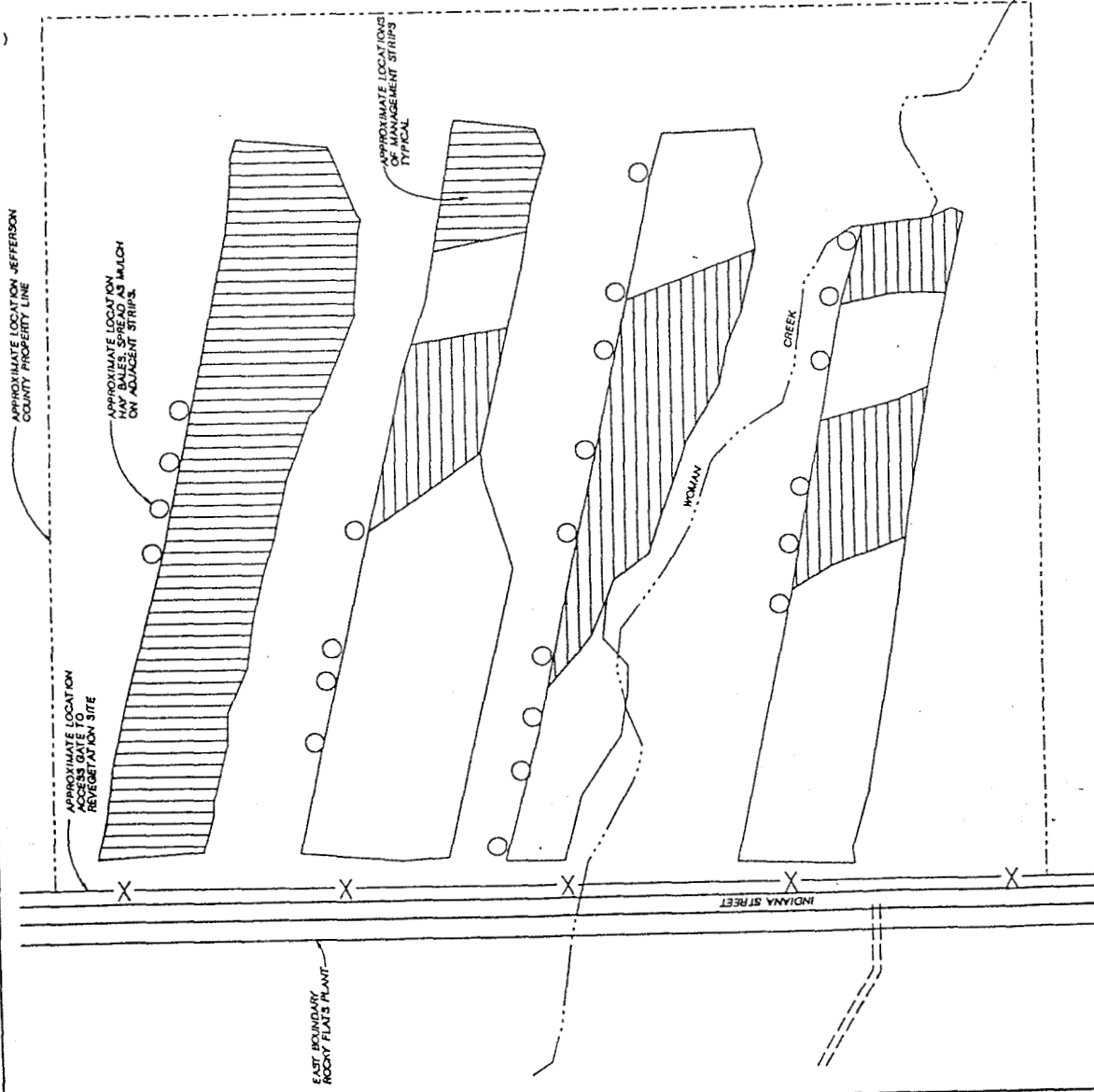
CLAYEY FOOTHILL AREAS

<u>Species</u>	<u>Common name -variety</u>	<u>Seeding rate</u> <u>(PLS lb/ac)*</u>
Grasses:		
<i>Agropyron smithii</i>	Western wheatgrass - Arriba	6.0
<i>Stipa viridula</i>	Green needlegrass - Lodorm	5.0
<i>Bouteloua gracilis</i>	Blue gramma - Lovington	5.0
<i>Stipa comata</i>	Needle-and-thread - native	0.5
<i>Bouteloua curtipendula</i>	Sideoats grama - Vaughn	4.0
<i>Oryzopsis hymenoides</i>	Indian rice grass - Nezpar	1.0
Shrubs:		
<i>Ceratoides lanata</i>	Winterfat - native or Hatach	0.4
<i>Chrysothamnus nauseosus</i>	Rabbitbrush - green plume, native	0.2
<i>Atriplex canescens</i>	Fourwing saltbush - native	0.3
Forbs:		
<i>Penstemon strictus</i>	Rocky Mtn. penstemon - Bandera	0.1
<i>Dalea purpurea</i>	Purple prairie clover - native or Kanab	0.5
<i>Linum lewisii</i>	Blue flax - Appar	0.3

* Pure live seed in pounds per acre



FROM TSCHESKE FOR J. WRIGHT ON G. HERRMAN AND G. HERRMAN	BY J. WRIGHT DATE JAN 1992 PROJ. 000308101	REUSE OF DOCUMENTS This document is the property of the U.S. Department of the Interior, Bureau of Land Management. It is loaned to you for your use only and is not to be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without the written authorization of BLM.	ROCKY FLATS PLANT JEFFERSON COUNTY REVEGETATION PLAN 1992 REVEGETATION PLAN	SHEET 1
				SECTION 7 1992 REVEGETATION ACTIVITIES



MAP LEGEND

- FENCE
- DRAINAGE CHANNEL
- UNIMPROVED DIRT ROADS
- APPROXIMATE PROPERTY BOUNDARY
- SEEDED WITH CLAYVY FOOTHILL SEED MIXTURE NOV, 1991.
- SEEDED WITH COBBLY FOOTHILL SEED MIXTURE NOV, 1991.

NOTE:
MOVED AREAS OF JULY, 1991
ARE NOT SHOWN

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PROJECT NO. 1000	DATE JAN 1992	DRAWN BY J. DICK	CHECKED BY G. HERMANN
PROJECT NO. 1000	DATE JAN 1992	PROJECT NO. 1000	DATE JAN 1992

The personal and equipment contamination surveys were performed using a Ludlum Model 3 count rate meter connected to a Ludlum 43-5 alpha scintillometer. This meter was calibrated to detect 20 dpm/probe area. Numerous surveys were performed both on personnel and field equipment (tractors, mowers, grass drill, etc.) during the mowing, seeding and harrowing field operations. The contamination surveys found no detectable activity.

Loose surface contamination smears were also taken on the same field equipment to verify the lack of contamination. These smears were counted in a Ludlum Model 2000 Scaler connected to a 43-10 alpha scintillometer. The resultant contamination levels did not exceed 11 dpm/100 cm² which were well below the action level of 20 dpm/100 cm².

During the mowing operation, potential airborne exposure to alpha emitting radionuclides (Plutonium, and Americium) was measured by providing each worker with a personal lapel air sampler. The filters from these air samplers were counted on the Ludlum Model 2000 Scaler, and the results indicated that there was no Plutonium or Americium activity present on the filters.

No radiological monitoring was performed during the hay spreading activity because there was very minimal disturbance of the soil (less than the previous field activities) and no measurable health hazard was detected previously.

No measurable health hazard was detected during any of the radiological monitoring of the field activities.

During the seeding and harrowing operation, the wind speed was monitored to avoid creating visible dust that could move offsite. The average wind speed during the seeding and harrowing operation was 5 to 10 mph with occasional gusts to 12 mph. RFP policy called for suspension of soil intrusive activities if a wind speed of 15 mph is exceeded. No field operations were suspended due to exceedance of this limit.

Recommendations for Future Activities

The 1991 field activities so far have been successful. The successful establishment of a mature grass species is not a one year endeavor, however. The following are recommendations for continuing activities during 1992 on the Jefferson County remediation lands:

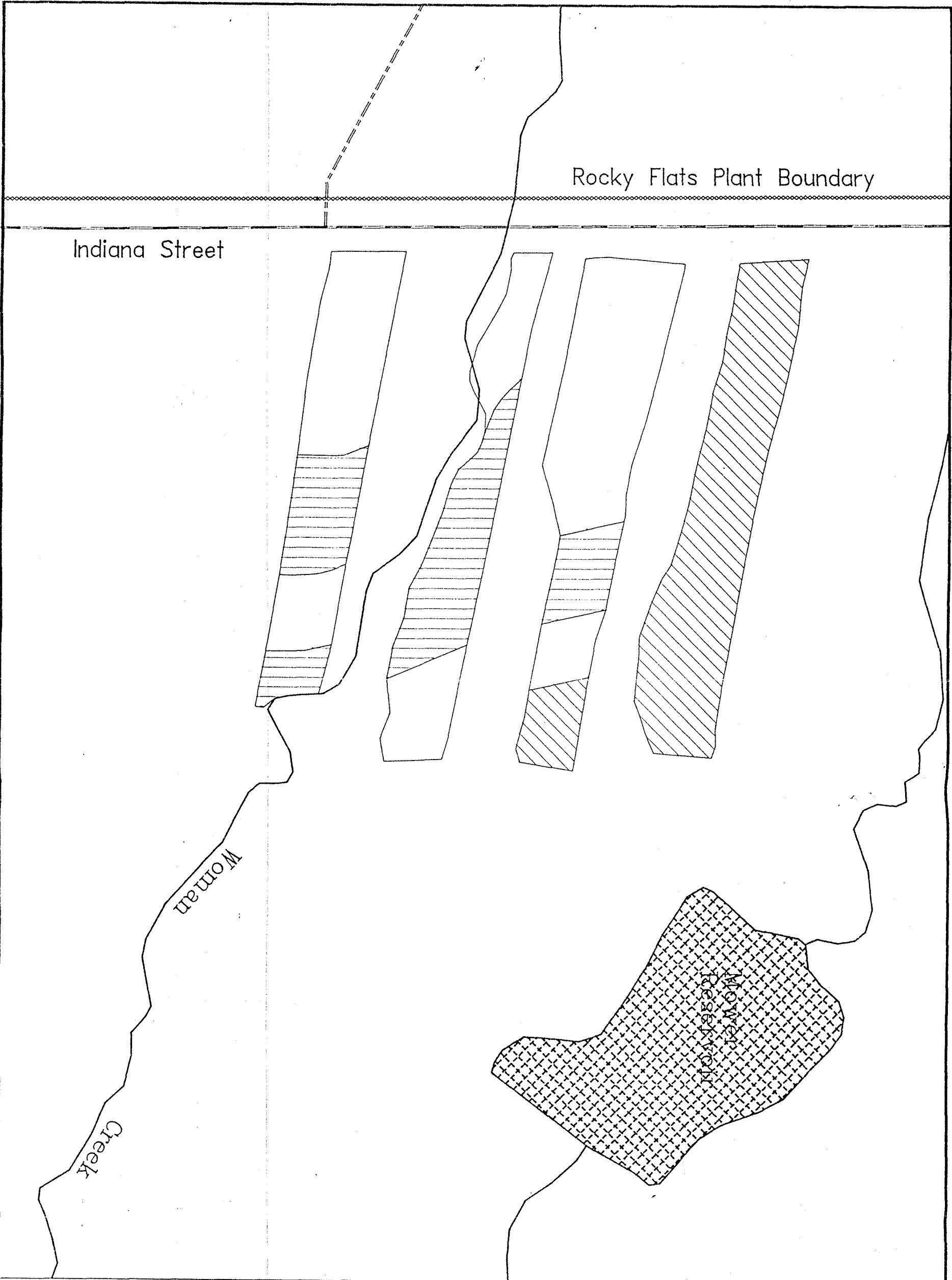
1. Continue monitoring the lands at a fairly intense level for the following parameters:
 - Germination of plant species sown in Fall 1991

- Growth and abundance of weed species
- Reinvasion of the areas by prairie dogs
- Obvious areas with poor germination or establishment
- Signs of obvious problems with seed germination or establishment due to prairie dogs or weed competition

The lands should be monitored during the early spring and early summer depending on the weather patterns, again in mid-summer, and again in the late summer/early fall periods. A late season monitoring using sampled plots for plant species composition and diversity should be conducted that evaluates the success of the two seasons of revegetation.

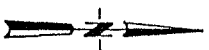
2. Depending on the results of the monitoring, the following activities or procedures may be necessary:
 - Weed control by application of pre-emergent herbicides (this is recommended based on the recent site inspection on January 3, 1992, at which time weeds had already germinated, and several species were in a rosette stage), or by mowing early in the season. A second mowing may be recommended depending on weed growth relative to the seeded species.
 - Reseeding selected areas that had poor germination or establishment of seeded species. This should be done in the late Fall using the same procedures as in the 1991 season, or a modification of these procedures if not successful in certain areas.
 - Continued prairie dog control in the remediation areas if reinfested from the surrounding uncontrolled populations.
3. Reassess the remediation lands for plant establishment and site conditions to plan the longer range goals (3 to 5 years, and 5 to 10 years) and for the revegetation to a stable, more natural grasslands vegetation.

APPENDIX



(Figure 2)
 Map of South Area (Sec. 18)
 of Jefferson County
 Remediation Land Showing
 Results of Summer 1991
 Revegetation Activities

- Streams, ditches, and other drainage features
- Medium duty roads
- Unimproved dirt roads
- Rocky Flats Plant boundary
- Surface water impoundments
- Seeded with clayey foothill seed mixture November, 1991
- Seeded with cobbly foothill seed mixture November, 1991
- Area not seeded during 1991 (grass species already well established)

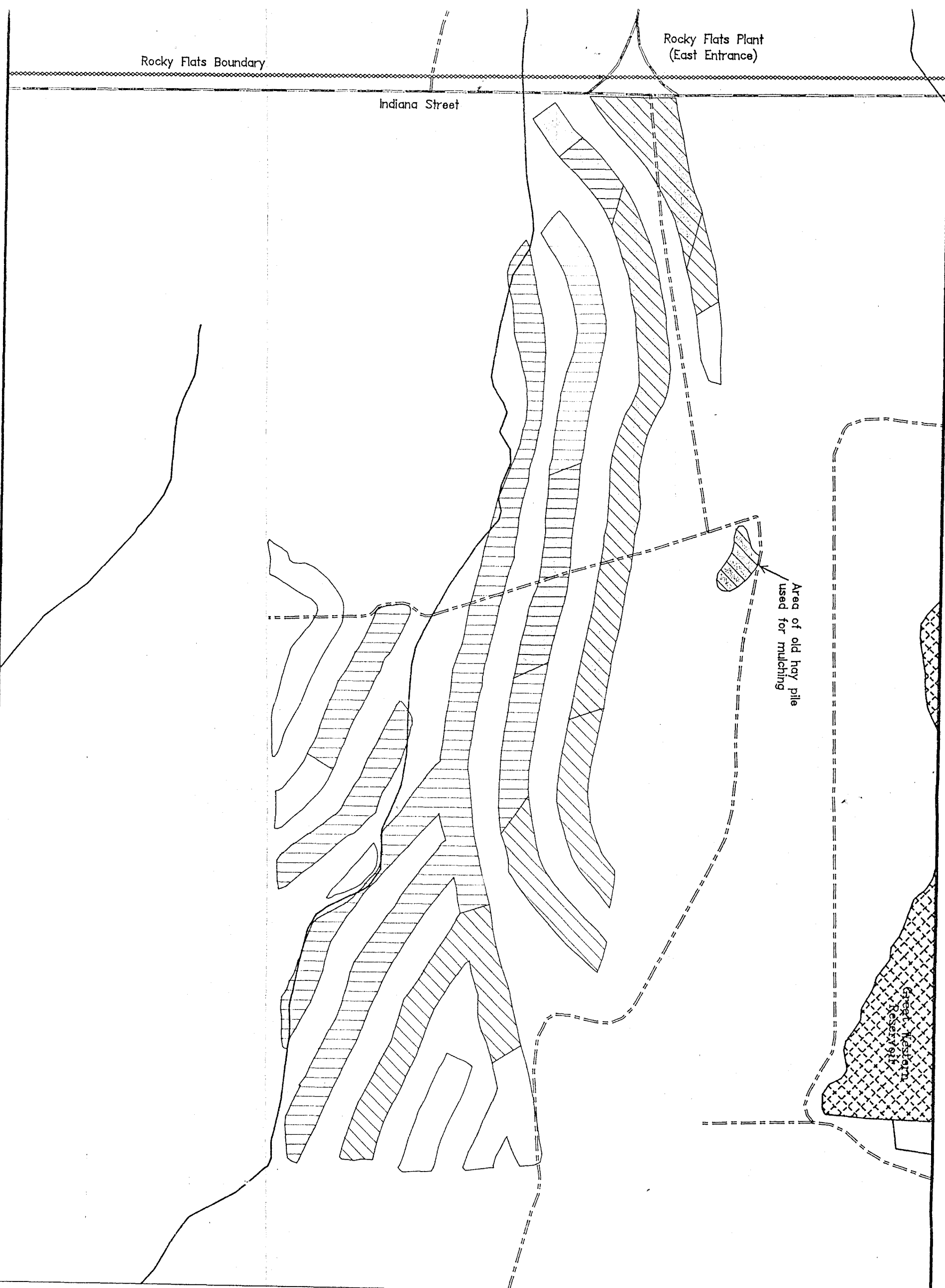


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Prepared by:

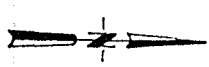
EG&G ROCKY FLATS

Rocky Flats Plant
 P.O. Box 464
 Golden, Colorado 80402-0464



(Figure 1)
Map of North Area (Sec. 7)
of Jefferson County
Remediation Land Showing
Results of Summer 1991
Revegetation Activities

- Streams, ditches, and other drainage features
- Medium duty roads
- Unimproved dirt roads
- Rocky Flats Plant boundary
- Surface water impoundments
- Seeded with clayey foothill seed mixture November, 1991
- Seeded with cobbly foothill seed mixture November, 1991
- Locations where hay mulch was spread December, 1991
- Area not seeded during 1991 (grass species already well established)



0 450 900
Mapscale 1 : 5400
1 inch = 450 feet

Prepared by:

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Date: 1-28-92